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BEYER WEAVER & THOMAS LLP
P.O. BOX 778
BERKELEY, CA 94704-0778

EXAMINER
SLOAN, NATHAN A

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>18 January 2000</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-35</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-35</u> is/are rejected.

7) ☒ Claim(s) <u>15 and 35</u> is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>18 January 2000</u> is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u>.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Drawings

1.   The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: item 110 of Figure 1 on page 2, line 15. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

2.   Claims 15 and 35 objected to because of the following informalities: use of the word "now." Examiner notes page 6, lines 33-35 of the specification discusses reverting to a first technique. Examiner requests that more precise language be used to claim that "now" is the time after which a first technique has been used, a second technique has been used, and a determination of acceptable level of noise has been made. Appropriate correction is required.

Claim Rejections - 35 USC § 103

3.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leano et al. (6,453,472) and in view of Kumar et al. (6,212,399).

With respect to claims 1 and 27, Leano et al. the claimed "method of adjusting the power of a cable modem on a cable network, the method comprising determining that cable modem signals received at or proximate a headend of the cable network fluctuate in power by more than a defined amount," is taught by Leano in column 5, lines 13-20. Leano teaches that this method may be implemented in computer readable code in column 6, lines 32-50. Leano also teaches calculating a power adjustment using a recent power measurement of a signal from the cable modem, as well as "instructing the cable modem to adjust its power based upon the calculated adjustment in column 5, lines 40-48. Leano does not explicitly teach adjusting the power based on a *plurality* of recent power measurements. Examiner notes that it is notoriously well known in the industry to remotely control the power of an upstream transmitter signal by sampling a plurality of recent power measurements and obtaining an average in order to minimize power spikes. To these means, Kumar teaches in column 6, lines 37-60 analyzing the last n power measurements and using statistical analysis methods including standard deviation, dispersion, or absolute value of the sum of the last n power signals. This analysis uses two pre-determined thresholds representing acceptable signal quality and thus power ranges and determines an appropriate adjustment of transmitter power. It would have been obvious for one skilled in the art at the time of the invention to modify the power adjustment methods as taught by Leano by sampling a number of signals to determine the power levels over time as in order to "prevent

unnecessarily wild fluctuations in the radiated power" as taught by Kumar in column 7, lines 8-11.

With respect to claim 2, the claimed "CMTS performs at least the determining and the calculating," is taught by Leano in column 5, lines 40-48.

With respect to claim 3, it is the position of the examiner that the claimed amplitude estimator in a CMTS used to take power measurements of signals from the cable modem inherent to the hardware configured to receive and compare a power input level from a cable modem with an adjust power level, as taught in column 9 lines 32-35 of Leano.

With respect to claims 4 and 28, Leano does not explicitly teach determining that signals fluctuate more than a defined amount by calculating a deviation "over multiple power measurements." In column 5, lines 21-28 Leano does teach determining if the actually power level deviates from a dynamic range associated with the cable modem, but not over multiple power measurements. Kumar teaches calculating a standard deviation of multiple power measurements as compared to determined thresholds using n samples in column 6, lines 37-60 on page 25, lines 1-8. It would have been obvious for one skilled in the art at the time of the invention to modify the power adjustment methods as taught by Leano by sampling a number of signals using statistical deviation to determine the power levels over time in order to "prevent unnecessarily wild fluctuations in the radiated power" as taught by Kumar in column 7, lines 8-11.

With respect to claim 5, Kumar teaches in column 6, lines 61-65 that n should be chosen to neither be too large and thus cause sluggish changes, or too small and thus too sensitive to transmission errors in the power control signals. It is therefore the position of the examiner that

it would have been obvious to chose a number such as 8 or 16 sample in order to provide an ideal sample that adequately reflects the state of power transmission.

With respect to claim 6, the claimed "determining that signals from the cable modem fluctuate more than the defined amount comprises determining that the cable modem has been instructed to change its power level more than a threshold percentage of opportunities for adjustment" is taught by Leano by using a polling interval with a determined amount of time to adjust power levels, as taught in column 12, lines 59-65. During the polling interval the cable modem is instructed to change it's power level by increasing and decreasing power when power fluctuates more than a defined amount until the power level falls within a predetermined range. If after a polling period, claimed threshold percentage of opportunities, is complete the power level is not determined to be within the range, the polling period may be repeated to further tune the power output of the cable modem.

With respect to claims 7 and 29, the claimed "calculating an average difference between an actual power and an expected power over at least eight recent power measurements at or proximate the head-end of the cable network" is not taught by Leano. Kumar explicitly teaches in column 6, lines 37-60 analyzing and comparing the last n power measurements to predetermined thresholds, claimed expected power, using statistical analysis methods including standard deviation, dispersion, or absolute value of the sum of the last n power signals. It would have been obvious for one skilled in the art at the time of the invention to modify the power adjustment methods as taught by Leano by sampling a number of signals to determine the power levels over time in order to "prevent unnecessarily wild fluctuations in the radiated power" as taught by Kumar in column 7, lines 8-11.

With respect to claim 8 and 30, Leano does not explicitly teach that "calculating the power adjustment comprises offsetting the average difference *by a multiple of the deviation* in actual power measurements." Examiner notes that a variety of statistical analysis methods, such as offsetting a mean by a multiple of the deviation are notoriously well known in the art. Kumar explicitly teaches in column 6, lines 37-60 analyzing and comparing the last n power measurements to predetermined thresholds, claimed expected power, using statistical analysis methods including standard deviation, dispersion, or absolute value of the sum of the last n power signals. It would have been obvious for one skilled in the art at the time of the invention to modify the power adjustment methods as taught by Leano by analyzing a number of power levels with various statistical analysis to determine a power adjustment in order to "prevent unnecessarily wild fluctuations in the radiated power" as taught by Kumar in column 7, lines 8-11.

With respect to claim 9 and 31, the claimed calculating a power adjustment by "determining an adjustment associated with a signal to noise ratio detected for upstream signals from the cable modem," is not explicitly taught by Leano. Kumar teaches in column 2, lines 38-45 that measuring interference as a function of the amount of power used with criteria such as signal to noise ratio, bit error rate, etc are notoriously well known in the art. It would have been obvious for one skilled in the art at the time of the invention to modify the techniques taught by Leano by examining a signal to noise ratio as is notoriously well known and taught to be so by Kumar in order to determine the current quality of signal and determine an appropriate power adjustment to maintain signal quality.

With respect to claim 10, Leano explicitly teaches adjusting power levels by sending a message from a CMTS to cable modem using well known DOCSIS standards in column 8, lines 1-13.

With respect to claim 11 and 32, Leano teaches the claimed "method of controlling power at which a cable modem sends data upstream on a cable network, wherein at or proximate a cable network head-end, the cable network periodically determines the power of upstream signals from the cable modem, comprising adjusting the cable modem power based on a first technique" in column 5, lines 13-28. Leano teaches that this method may be implemented in computer readable code in column 6, lines 32-50. Leano teaches adjusting power if the signal contains "more than a threshold level of noise or fluctuation" by comparing the power level received with a desired power level in a periodic ranging request in column 10, lines 31-40. Leano does not explicitly teach "adjusting the cable modem power based upon a second technique that *averages* recent cable modem power measurements." Examiner notes that it is notoriously well known in the industry to remotely control the power of an upstream transmitter signal by sampling a plurality of recent power measurements and obtaining an average in order to minimize power spikes. To these means, Kumar teaches in column 6, lines 37-60 analyzing the last n power measurements and using statistical analysis methods including standard deviation, dispersion, or absolute value of the sum of the last n power signals. This analysis uses two pre-determined thresholds representing acceptable signal quality and thus power ranges and determines an appropriate adjustment of transmitter power. It would have been obvious for one skilled in the art at the time of the invention to modify the power adjustment methods as taught by Leano by sampling a number of signals to determine the power levels over time in order to

"prevent unnecessarily wild fluctuations in the radiated power" as taught by Kumar in column 7,

lines 8-11.

With respect to claims 12 and 33, the claimed first technique of claims 11 and 32

comprising determining a difference between actual and expected power of a cable modem

signal and instructing a power change based on the difference is explicitly taught by Leano in

column 9, lines 31-48.

With respect to claims 13 and 34, the claimed second technique of claims 11 and 32

comprising "calculating a power adjustment based upon a *plurality of* recent differences between

actual and expected power of upstream signals" and instructing an power adjustment based on

the calculated adjustment is not explicitly taught by Leano. Kumar teaches calculating a

standard deviation of multiple power measurements as compared to determined thresholds using

n samples in column 6, lines 37-60 on page 25, lines 1-8. It would have been obvious for one

skilled in the art at the time of the invention to modify the power adjustment methods as taught

by Leano by sampling a number of signals using statistical deviation to determine the power

levels over time in order to "prevent unnecessarily wild fluctuations in the radiated power" as

taught by Kumar in column 7, lines 8-11.

With respect to claim 14, Leano explicitly teaches using ranging requests to track power

levels in column 8, lines 40-45 and conforming to well known DOCSIS standards in column 8,

lines 1-13.

With respect to claim 15 and 35, Leano teaches "determining that the upstream signals

from the cable modem contain less than the threshold level of noise" by determining and

comparing the signal with determined levels as noted above. As seen in Figure 5, an initial

ranging 503 occurs to setup cable modems at predetermined transmission levels. Once the initial

ranging is completed and a cable modem power level is set, normal period ranging 505 is used,

claimed "first technique for adjust the cable modem power." Although Leano does not explicitly

teach *returning* to the first technique, examiner notes that it is often the case that cable modem

will be in normal periodic ranging and go into an offline state as a result of being disconnected

from the network. Upon reconnection the cable modem undergoes initial ranging again, after

which ranging techniques *return* to normal ranging.

With respect to claims 16 and 19, Leano explicitly teaches a cable modem termination

system with receiver used to receive signals and determine input power levels in column 5, lines

34-47. Leano also teaches a processor used to calculate a power adjustment based on a recent

power measurement of a signal from the cable modem, as well as "means for generating

instructions to the cable modem to make the calculated power adjustment" in column 8, lines 48-

65. Leano does not explicitly teach means for calculating a single power adjustment based on a

plurality of recent power measurements. Kumar teaches in column 6, lines 37-60 analyzing the

last n power measurements and using statistical analysis methods including standard deviation,

dispersion, or absolute value of the sum of the last n power signals. This analysis uses two pre-

determined thresholds representing acceptable signal quality and thus power ranges and

determines an appropriate adjustment of transmitter power. It would have been obvious for one

skilled in the art at the time of the invention to modify the CMTS system as taught by Leano by

sampling a number of signals to determine the power levels over time in order to "prevent

unnecessarily wild fluctuations in the radiated power" as taught by Kumar in column 7, lines 8-

11.

With respect to claim 17, the claimed receiver that determines a difference between

detected and expected power levels and calculates a single power adjustment based on the

difference is taught by Leano in column 9, lines 31-48. Leano does not explicitly teach

calculating a single power adjustment based upon a *plurality* of detected power levels. Kumar

teaches calculating a standard deviation of multiple power measurements as compared to

determined thresholds using n samples in column 6, lines 37-60 on page 25, lines 1-8. It would

have been obvious for one skilled in the art at the time of the invention to modify the CMTS

system as taught by Leano by sampling a number of signals using statistical deviation to

determine power adjustment in order to "prevent unnecessarily wild fluctuations in the radiated

power" as taught by Kumar in column 7, lines 8-11.

With respect to claim 18, the claimed receiver being hardware is seen in Figure 2 as item

200 of Leano. The claimed software used to calculated and generate instructions is taught by

Leano in column 5, lines 50-59.

With respect to claim 20, Leano does not explicitly teach that "calculating the power

adjustment comprises offsetting the average difference *by a multiple of the deviation* in actual

power measurements." Examiner notes that a variety of statistical analysis methods, such as

offsetting a mean by a multiple of the deviation are notoriously well known in the art. Kumar

explicitly teaches in column 6, lines 37-60 analyzing and comparing the last n power

measurements to predetermined thresholds, claimed expected power, using statistical analysis

methods including standard deviation, dispersion, or absolute value of the sum of the last n

power signals. It would have been obvious for one skilled in the art at the time of the invention

to modify the power adjustment methods as taught by Leano by sampling a number of signals to

determine the power levels over time in order to "prevent unnecessarily wild fluctuations in the radiated power" as taught by Kumar in column 7, lines 8-11.

With respect to claim 21, the claimed calculating a power adjustment by "determining an adjustment associated with a signal to noise ratio detected for upstream signals from the cable modem," is not explicitly taught by Leano. Kumar teaches in column 2, lines 38-45 that measuring interference as a function of the amount of power used with criteria such as signal to noise ratio, bit error rate, etc are notoriously well known in the art. It would have been obvious for one skilled in the art at the time of the invention to modify the techniques taught by Leano by examining a signal to noise ratio as is notoriously well known and taught to be so by Kumar in order to determine the current quality of signal and determine an appropriate power adjustment to maintain signal quality.

With respect to claim 22, Leano explicitly teaches using ranging requests to track and adjust power levels in column 8, lines 40-45 and conforming to well known DOCSIS standards in column 8, lines 1-13.

With respect to claim 23, Leano teaches the claimed "determining whether signals from a cable modem contain more than a threshold level of noise" in column 5, lines 51-59 by comparing input power level signals at the head end to predefined levels to minimize non-recognition (as a result of noise) of the cable modem. It is well known that maintaining ideal output power levels directly correlates to minimizing noise in a signal.

With respect to claims 24 and 26, Leano et al. teach "method of adjusting the power of a cable modem on a cable network, the method comprising determining that cable modem signals received at or proximate a headend of the cable network fluctuate in power by more than a

defined amount," in column 5, lines 13-20. Leano also teaches calculating a power adjustment

using a recent power measurement of a signal from the cable modem, as well as "instructing the

cable modem to adjust its power based upon the calculated adjustment in column 5, lines 40-48.

Leano does not teach this system and method in the field of frequency adjusting using a plurality

of measurements. Examiner notes that it is notoriously well known in the industry to remotely

control the frequency of an upstream transmitter signal by sampling a plurality of recent

frequency measurements and examining the signal to noise ratio. The process of performing

periodic ranging by signal sampling is well known to be applied to both power and frequency

level setting techniques. To these means, Kumar teaches in column 6, lines 37-60 analyzing the

last n power measurements and using statistical analysis methods including standard deviation,

dispersion, or absolute value of the sum of the last n power signals. This analysis uses two pre-

determined thresholds representing acceptable signal quality and thus power ranges and

determines an appropriate adjustment of transmitter power. Examiner takes Official Notice that

it is well known in the industry to perform periodic ranging for frequency selection, including

examining a plurality of recent measurements and calculating deviations from a desired

frequency. It would have been obvious for one skilled in the art at the time of the invention to

modify the transmission level setting techniques as taught by Leano and Kumar by sampling a

number of signals to determine the frequency levels over time in order to minimize the signal to

noise ratio.

With respect to claim 25, the claimed "CMTS performs at least the determining and the

calculating," is taught by Leano in column 5, lines 34-48. Although Leano does not explicitly

teach periodic ranging for frequency selection, examiner takes Official Notice that it is well

known in the art to detect and calculate frequency adjustments based on a plurality of frequency

measurements. It would have been obvious for one skilled in the art at the time of the invention

to modify the system taught by Leano and Kumar by performing frequency selection in addition

to power selection in order to optimize transmission.

Conclusion

5.   The prior art made of record and not relied upon is considered pertinent to applicant's

disclosure.

Laborde et al. (5,710,982) teach a sytem used to control power levels in a satelitte

communication system. Upstream power levels are sampled as the average power transmitted

and a number of samples are taken. After a number of samples are taken it is determined if more

samples indicate a need for increase or decrease in power levels, and an appropriate correction is

made.

Schrock (4,512,033) teach a system used to remotely control power of upstream signals

in a communication system.

McMullan, Jr. et al. (5,142,690) teach a system for calibrating the upstream power level

of transmitters. Eight samples are used at successively increasing power levels to determine an

optimum operating power level.

Daily et al. (6,111,887) teach a system and method for power tuning a terminal in a

communications system. A number of samples including the maximum and minimum power

levels are averaged together along with the current sample to determine a proper power

increment.

Schwartzman et al. (6,385,773) teach a system and method for upstream frequency

channel transition. Power levels are sampled over time and examined using averages, maximum,

minimum, and current power levels. Additionally the bit error rate is used along with power

sampling techniques to sample transmission levels.

Chen et al. (6,032,019) teach a system used to locate ingress noise gaps in upstream

channels. Power levels are set to an initial value and decremented to obtain an optimum carrier-

to-noise ratio.

Fung et al. (6,285,960) teach a system used to control the power level of a router line

card. Various modes are used to setup and control the output power level around a predefined

value.

Hart (5,606,725) teach a system that dynamically adjusts upstream power level if a bit

error rate falls outside of predetermined levels.

Burke et al. (5,790,533) teach a system and method for controlling power in cable access

units. Power levels are checked to determine if it falls within a desired range and if not an

adjustment value is used to correct the power level.

Tiedemann, Jr. et al. (6,035,209) teach a system and method for controlling power in a

communication apparatus by setting an initial power level and then decreasing the power to a

desired level.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan A Sloan whose telephone number is (703)305-8143. The examiner can normally be reached on Monday-Friday from 8:00AM to 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Miller, be reached on (703) 305-4795. The fax phone number for the organization where this application or proceeding is assigned is (703)308-5399.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-3900.

JOHN MILLER
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600